

FOURTH INTERIM REPORT OF THE
WORKING PARTY 4
ON ALTERNATIVE MEDIA TECHNOLOGY AND BROADCAST INTERFACE
of the
PLANNING SUBCOMMITTEE
of the
ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE

March 6, 1991

PS/1.04 007

FINAL REPORT
of
FCC ACATS Working Party 4
Alternative Media Technology and Broadcast Interface
(Draft March 6, 1991)

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY
2.0	BACKGROUND
3.0	SUMMARY OF WORK
3.1	EVALUATION OF ATV SYSTEM PROPONENTS
	1. Suitability for Cable Television Distribution
	2. Suitability for Satellite Distribution
	3. Suitability for Terrestrial Microwave Distribution
	4. Suitability for Fiber Optic Transmission
	5. Suitability for use in Pre-Recorded Media
3.2	OTHER RELATED WORK
	EIA NTIA FCC
	ATSC NRC NAB
	NCTA CABLE LABS
	IEEE ATTC
	OTHERS
4.0	CONCLUSIONS AND RECOMMENDATIONS
	Spectrum Utilization
	Technology
	Consumer Issues
	Security system Issues
	ATV Implementation
5.0	APPENDIX
	Definitions



Advisory Committee on
Advanced Television (ATV) Service

Doc. No. _____

Date MAR 21 1991

ATTACHMENTS:

PS/WP4-0063	Notice and Agenda for June 20, 1990 Meeting
PS/WP4-0064	Minutes of June 20, 1990 Meeting
PS/WP4-0065	Attendance List of June 20, 1990 Meeting
PS/WP4-0066	Electronic Industries Association (EIA) ATV Multiport Receiver S/Ctte Phase 1 Activites Summary Report Dated March 21, 1990 - E. Lubchenko, Philips Labs.
PS/WP4-0067	Summary of Demonstrations on Business Aspects of HDTV given to various members of Congress June 18-19, 1990 - L. Lockwood
PS/WP4-0068	Specs Sheet for 45 Mbps Video Coder/Decoder made by Compression Labs - L. Lockwood 6/1/90



Advisory Committee on Advanced Television (ATV) Service

Doc. No. PS/WP4-0073

Date _____

FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION Planning Subcommittee

PS/WP-4 Report to the Planning Subcommittee

March 8, 1991

BACKGROUND

Working Party 4 -- Alternative Media Technology and Broadcast Interface has met twice since the third interim report. Attached are documents that were generated and gathered during those meetings.

Previous work of PS/WP-4 includes: 1) characterization of various alternative media namely cable, satellite, microwaves, fiber optics and pre-recorded media; 2) development of specific alternative media test plans ; and, 3) development of a strawman "multiport" document that facilitates consumer interfacing between broadcast ATV and alternative media. Consequently, PS/WP-4 contributed to an increase in the industry's level of awareness on the need to efficiently interface between broadcast ATV and alternative media.

Since December 1989, PS/WP-4 focussed on monitoring the activities of various FCC Working parties and other industry organizations such as ATTC, Cable Labs, NCTA, EIA, AEA, IEEE and ATSC in order to determine the prominent issues concerning interfacing ATV terrestrial broadcast signals with alternative media. In addition, PS/WP-4 studied basic requirements and minimum features of an ATV receiver.

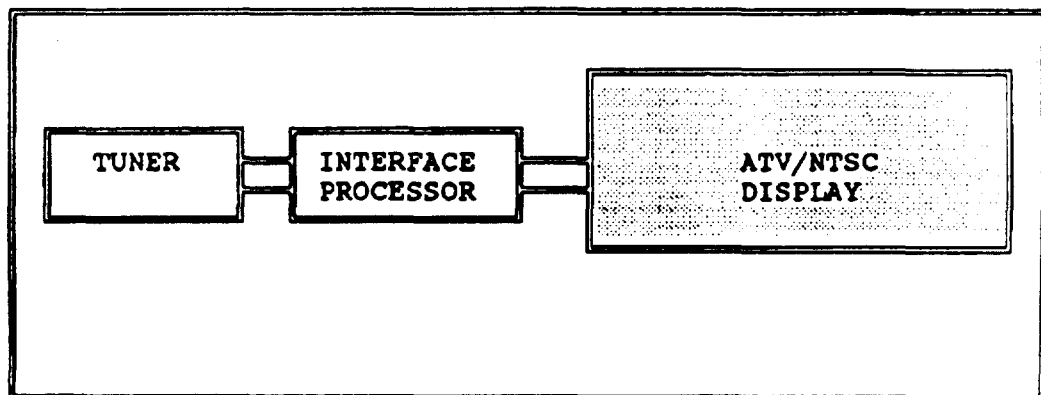
SUMMARY OF WORK and RESULTS

Substantial progress has been made by the EIA and the ATSC in addressing interoperability issues. Document PS/WP4-0066 is a Phase I Activities Summary Report of the EIA ATV Multiport Receiver Subcommittee, which describes an hierarchical family of ATV multiports and their characteristics. They propose three basic structures that will provide receiver manufacturers, television service providers, and consumers with standardized interfaces that can be implemented in various levels of performance and complexity. We commend the EIA for providing very useful information.

PS/WP-4 found that many ambiguous new terms have evolved in the ATV proceedings which created confusion. Thus, PS/WP-4 attempted to simplify and clarify terms in the context of alternative media, and offered the following definition:

An ATV receiver consists of a tuner/demodulator which yields non-carrier protocol(s) to an Interface processor and a display. The ATV receiver is capable of accepting non-carrier signals at interface points, and operates in the visual, aural and ancillary domains.

Basic Elements of an Advanced Television Receiver



The interface Processor in the above diagram is a device that accepts non-carrier

protocol(s) such that Information can be extracted and/or manipulated for subsequent display.

Conditional access is also an essential element of the selected ATV standard, and PS/WP-4 believes that various issues regarding conditional access, compatibility and interoperability need further study. Some conditional access issues discussed are:

a. Anti-taping

This mechanism embedded in the transmission, distribution and display of ATV signals control the consumer's ability to store or reproduce certain programs or services. The anti-taping mechanism might also include a limit on the number of times a program or service may be viewed or used.

b. Addressability

This feature is the ability of a program or service provider to identify and subsequently control a consumer. Some questions were raised during these discussions; should there be a way for a consumer to access 'all' potential programs or service providers in a timely and non-discriminatory manner? If addressability is desirable, then what is the minimum number or addressable subscribers? Should addressability be transparent to 'all' types of media?

c. Service on Demand

Also called video-on-demand, pay-per-view or near-video-on-demand, this feature is closely linked to the addressability functions and allows consumers to access various services whenever he/she desires.

d. Interactive

A service may be considered Interactive if consumers perceive that exchange of information occur between him/herself and the service provider. Data exchange may or may not be in real time, and the actual flow of information may involve more than one media.

e. Service Tiers

A tier may be defined as an arbitrary combination of programs/services that comprise a single service. Tiers may be further combined and purchased as a single package. The number of tiers that an ATV system is capable of handling need to be defined.

f. Standardized Universal Access System

Is there a need to standardize a universal access system in which 'all' consumers contact either by phone, mail or other means, one central authorization depot? should 'all' program/service providers be required to participate ?

g. Blackout

The blackout feature is defined as a program/service provider's capability to disable real-time viewing of programs/services for a given region. An alternative program/service may be provided in lieu of the blacked out program for the duration of the blackout time.

CONCLUSION

Much of PS/WP-4's work has been completed, and numerous organizations have picked up on what we began. Even though most ATV system proponents now have digital systems, we believe that the test plans, strawman documents and definitions that we have developed still apply in the digital domain. It is our goal to continue monitoring industry activities and participate fully when needed.

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Advisory Committee on
Advanced Television (ATV) Service

Doc. No. PS/WP4-00

Date MAY 29, 1990

Planning Subcommittee

Working Party 4 -- Alternative Media Technology and Broadcast Interface

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MEETING NOTICE

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PS/WP-4 will hold a meeting on Wednesday, June 20, 1990 from
10:00 a.m. to 2:00 p.m. at:

National Cable Television Association
Conference Room
1724 Massachusetts Ave.
Washington, D.C. 20036

* * * * *

AGENDA:

1. Progress report from representatives of:

EIA	NTLA	FCC
ATSC	NRC	NAB
NCTA	CABLE LABS	
IEEE	ATTC	

2. Discuss action items (attached) assigned to PS/WP-4 by Planning Subcommittee.

3. Draft an outline and assign members of task force to prepare PS/WP-4 report to Planning Subcommittee.

4. Other business

PS/WP-4

Alternative Media Technology and Broadcast Interface

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MINUTES OF THE JUNE 20,1990 MEETING

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1. PS/WP-4 met on June 20, 1990 at the NCTA offices in Washington, D.C. The chairman, Mr. Ed Horowitz called the meeting to order at 10:08 A.M. Virgil Conanan served as secretary.
2. The agenda, document number PS/WP4 -0063 was approved without changes. Document number PS/WP4065 is the attendance list.
3. After a brief introduction, the chairman began the discussions of the first item on the agenda. He reported that the Electronic Industries Association (EIA) ATV Multiport receiver Subcommittee, co-chaired by J. Donahue and A. Toth completed a summary report on their Phase I activities. Their report (document number PS/WP4 -0066) is a comprehensive document describing a hierarchical family of ATV multiports. The envisaged multiport structure provides a standardized "generic" consumer interface that includes a group of analog minimum service ports, another group of analog extended service ports and finally, a combination of analog and digital ports for the digital extended service.
4. The Institute of Electrical and Electronic Engineers, the National Research Council and the Committee on High Resolution Systems jointly conducted an HDTV workshop. L. Lockwood reported that their discussions included the standardization of an open-architecture digital HDTV that is modular, scaleable and extensible. They recognize the importance of synergies in a multi-media HDTV environment, but participation from the broadcast and cable industries is lacking.
5. The NTIA and other communications committees within the government demonstrated the business aspects of HDTV to various members of the congress. Larry Lockwood summarized the event and submitted a document prepared by the Subcommittee on Telecommunications and Finance, document number PS/WP4 -0067 which lists the companies that participated, and the nature of their demonstration. Emphasizing the importance of video compression in HDTV, he also submitted a specifications sheet for 45 Mbps video coder/decoder made by Compression Labs Document number PS/WP4 - 0068.

6. The ATSC working group on Interoperability met jointly with the EIA ATV Multi-port Subcommittee and reported the outcome of their meeting to the ATSC parent Technology group on distribution. The same report will be made available to PS/WP-4 members.
7. Much of the HDTV work done by the FCC, CABLE LABS, ATTC and the NAB centered around testing of advanced terrestrial television system proponents. The delivery of the standards format converter, a crucial piece of test equipment being developed by Tektronix for the ATTC has been delayed until the fall this year. Work has begun on the cable test bed at ATTC, which is being funded by cable labs. Field testing is now a high priority action item in many working parties within the ATS Advisory Committee.
8. The chairman then addressed the PS/WP-4 statement of work for the fourth period. Regarding the first work item, the chairman said he is satisfied with the results produced by the EIA and he will include the EIA's phase 1 report in PS/WP-4's report to the planning subcommittee.
9. Regarding the second work item, the group identified the DBS systems below. It was noted that each format was developed with a specific target business market, which may or may not encompass terrestrial broadcasting.
 - * Scientific/Atlanta HD-B-MAC
 - * Philips HD-MAC-60
 - * NHK MUSE family
 - * General Instruments DigiCipher
10. To determine compatibility and suitability of a proposed HDTV system for satellite distribution, the group agreed to resubmit to the planning subcommittee a document titled:

Proposed Testing Procedures for Advanced Television Systems
FCC ATS PS/WP-4
Alternative Media Technology and Broadcast Interface

Suitability for Satellite Distribution
Version 3.0
December 13, 1988

11. During the discussions of the third work statement, it was mentioned the original PS/WP-4 test plan already included a complete, conceptual field test plan. Therefore, PS/WP-4 need not do further work on developing a field test plan. Instead, it will

be up to either ATTC, CABLE LABS, or other testing bodies to implement those procedures outlined in the said test plan.

12. Conditional access was mentioned as a necessary component of the chosen ATV standard. Numerous organizations are currently studying the desirable attributes for ATV conditional access. Both the EIA and the ATSC working group on interoperability are investigating the technical issues. However, there are non-technical issues such as economic and regulatory issues that need to be defined. It was felt that the diverse membership of PS/WP-4 makes it an ideal forum to discuss both technical and non-technical issues regarding conditional access, compatibility and interoperability. Some conditional access issues that were identified and need further clarification are:

- a. Anti-taping

The mechanism embedded in the transmission, distribution and display of ATV signals for controlling the consumer's ability to store or reproduce certain programs or services. The anti-taping mechanism might also include a limit on the number of times a program or service may be viewed or used.

- b. Addressability

This feature is the ability of a program or service provider to identify and subsequently control a consumer. Some questions were raised during these discussions. Should there be a way for a consumer to access 'all' potential program or service provider and timely and non-discriminatory manner? If addressability is desirable, then what is the minimum number or addressable subscribers? Should addressability be transparent to 'all' type of media?

- c. Service on Demand

Also called video-on-demand, pay-per-view or near-video-on-demand, this feature is closely linked to the addressability functions and allows consumers to access various services whenever he/she desires.

- d. Interactive

A service may be considered interactive if consumers perceive that exchange of information occur between himself and the service provider. Data exchange may or may not be in real time, and the actual flow of information may involve more than one media.

- e. Service Tiers

A tier may be defined as an arbitrary combination of programs/services that comprise a single service. Tiers may be further combined and purchased as a single package. The number of tiers that an ATV system is capable of handling need to be defined.

f. Standardized, Universal Access System

Is there a need to standardize a universal access system in which 'all' consumers contact either by phone, mail or other means, one central authorization depot? should 'all' program/service providers be required to participate ?

g. Blackout

The blackout feature is defined as a program/service provider's capability to disable real-time viewing of a programs/services for a given region. An alternative program/service may be provided in lieu of the blackedout program for the duration of the blackout time.

13. Other issues raised were: handling of ancillary services, requirements for ghost canceling, data channels, and cable security.
14. There were no new business discussed. The chairman thanked those present and adjourned the meeting at 12:30 P.M.

* * * * *

PS/WP-4 ATTENDANCE LIST
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FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION

Planning Subcommittee

Working Party 4 -- Alternative Media Technology and Broadcast Interface

Chair - Ed Horowitz

MEETING NOTICE

PS/WP4-0004

PS/WP-4 will hold a meeting on Wednesday, March 6, 1991
from 10:00 a.m. to 12:30 pm at:

National Cable Television Association
Conference Room
1724 Massachusetts Ave.
Washington, D.C. 20036

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AGENDA:

1. Progress report from representatives of:

EIA	NTIA	FCC
ATSC	NRC	NAB
NCTA	CABLE LABS	OTHERS
IEEE	ATTC	

2. Discussion and/or definition of "ATV Receiver" in context of alternative media.

3. Discussion of PS/WP-4 final report to FCC ACATS for 1992. (Draft outline attached)

3. Assignment of action items.

4. Other business

FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION
Planning Subcommittee

Working Party 4 -- Alternative Media Technology and Broadcast Interface

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MINUTES OF THE MEETING -- March 6, 1991

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Draft March 8, 1991

Working Party 4, Alternative Media Technology and Broadcast Interface (PS/WP-4) met in Washington, D.C. on Wednesday, March 6, 1991 at the NCTA. The Chairman Ed Horowitz presided over the meeting, Virgil Conanan served as secretary.

1. Ed Horowitz opened the meeting at 10:30 AM with an introduction of those present, and then he briefly reviewed PS/WP-4's previous work.
2. Regarding the first agenda item, Virgil Conanan reported on the ATSC specialist groups that work on topics concerning alternative media.

Interoperability and Consumer Product Interface specialist group, (T3S2 headed by B. Lechner) has been studying interoperability of ATV signals with cable, satellite, broadcast, VCR, and other media. Last November, in the ATSC T3 meeting, they reported that there is no clear definition of the term "baseband" and that they welcome contributions from other parties such as PS/WP-4.

T3S3 -- The Specialist Group on Digital Services (G. Stubbs) has identified various features for "conditional access" but several parties objected to their proposal to standardize the features. The opposition stated that standardization would limit flexibility in implementation. Choosing features for conditional access is quite complex because it is usually driven by a combination of many business and technical factors. Don McMillan of CRC added that T3S3 is also studying interfacing of ATV with various ancillary services.

3. Reporting for Cable Labs, Ed Horowitz said that the simulated cable system at the ATTC is almost completed. Additional CATV passive devices such as taps and splitters are being integrated to simulate a "real life" condition and determine if resulting microreflections would be objectionable for ATV viewing. The installation of a CATV fiber optic trunk simulation is reportedly on schedule.
4. Don McMillan then reported for CRC: A dry-run of subjective test setup has been successfully completed; subjective test program sequence materials is being shot in New York; and, that the delivery of the Tektronix format converter has been delayed.
5. George Hanover said the EIA ATV Receiver Interface Subcommittee has completed a report. The group is currently studying if YUV input is more appropriate than Y/C as a

baseline baseband video input. The chairman suggested that PS/WP-4 continue monitoring the EIA's activities since both groups have similar goals.

6. Moving on to the "ATV Receiver" topic, Virgil Conanan explained why there is a need for PS/WP-4 to define this term. He said that at various FCC ACATS working parties and task forces as well as other groups working on interoperability and receiver interfacing, the terms "ATV receiver" and "baseband" have been used with ambiguous meanings. Also, the term "reference ATV receiver" need to be precisely defined since a terrestrial TV station's desired-to-undesired signal to noise ratio, (hence coverage) can either increase or decrease depending on the RF characteristics of the so-called reference ATV receiver.

7. Jeff Krauss said that the Planning Factors group is probably looking at these characteristics. George Hanover said it is important to define the reference receiver because ATV proponent systems will appear more favorable than others if "more advanced" receivers are used. Changes in receiver characteristics will determine the proponent system's ability to deal with taboos and co-channel interference.

8. Regarding the term "baseband", Larry Lockwood explained that any signal may be considered baseband so long as no "carrier" exists to carry that signal. Encoded signals such as composite NTSC, Y/C or YUV may be considered baseband even though the same signal includes ancillary for captioning, VITS or sound in the vertical or horizontal intervals. A completely digital signal carrying coded and compressed video, audio, ancillary data and error correction signals that is extracted from a demodulator is considered baseband. There was agreement on Larry's definition that "non-carrier" type signals may be considered baseband. For interoperability, or friendliness towards alternative media, it was agreed that interfacing among ATV equipment such as ATV VCR, ATV display, ATV satellite receiver, set top cable ATV converters and others would be simpler with "ATV baseband" signals, according to the above definition.

9. In the discussions, it became apparent that the traditional definition of "TV receiver" is no longer valid for ATV, especially for spectrum planning purposes. RF characteristics such as tuner noise figure, bandwidth, shape factor and image rejection are the dominant factors that affect signal coverage. It was agreed that defining the appropriate values for these factors is not the responsibility of PS/WP-4.

10. Having separated the tuner requirements, PS/WP-4 proceeded to define another block following the ATV tuner section, which is the Interface Processor.

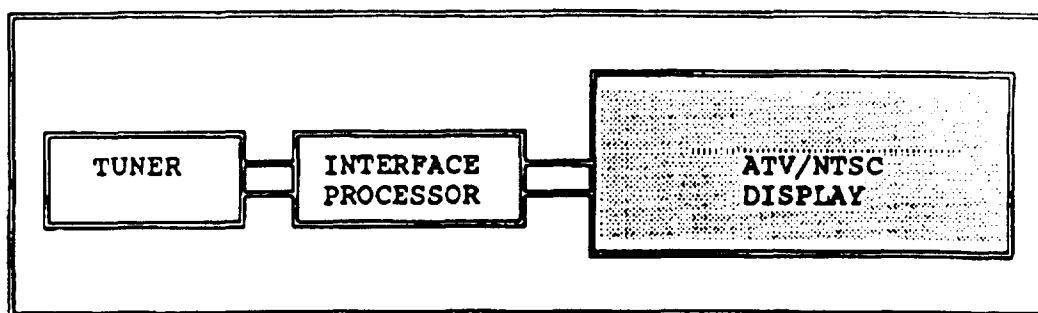
An Interface Processor is a device that accepts non-carrier protocol(s) such that information can be extracted and/or manipulated for subsequent display.

11. Bill Pohts suggested that information from previous discussions PS/WP-4 can also be used to define the ATV receiver in the context of alternative media. Hence:

An ATV receiver consists of a tuner/demodulator which yields non-carrier protocol(s) to an interface processor and a display. The ATV receiver is capable of accepting non-carrier signals at interface points, and operates in the visual, aural and ancillary domains.

12. PS/WP-4 agreed on the basic elements comprising an ATV receiver as shown below. The ATV RECEIVER's tuner, interface processor and display is accessible to any of the alternative media such as cable, satellite and recorded media.

BASIC ELEMENTS OF AN ATV RECEIVER



Communication with the ATV receiver's Interface Processor does not necessarily imply physical means, such as connectors or cables. For example, commands can be downloaded via one ATV channel and demodulated by the tuner. The group envisioned several ways to physically interface with the ATV receiver:

- 1) by means of cables and connectors containing unintelligible baseband (non-carrier) signals. Examples of these signals are scrambled analog signals or compressed digital data.
- 2) by means of standard cables and connectors containing intelligible baseband signals that can directly drive the display apparatus. Examples of these signals are RGB, YUV, Y/C and other standard composite baseband video signals.

Maximum interfacing flexibility is desired because it is conceivable that alternative media would have many different signal formats that need to interface with the consumer's ATV receiver.

13. The discussion of PS/WP-4 final report to FCC ACATS for 1992 was deferred until the next meeting.

14. Ed Horowitz will submit a report to the Planning Subcommittee for the ACATS fourth interim report by Friday, March 8, 1991.

15. As action items, the chairman said the group would continue monitoring the activities of other FCC working parties and industry groups and report them accordingly.

16. On other business, Virgil Conanan announced that another SS/WP-1 "Hell Week" is scheduled on March 20-22 to pre-certify digital systems by MIT-ATVA, ZENITH-AT&T, ATRC and NHK's Narrow MUSE. The meeting adjourned at 1:00 PM.

WP 41 - PSS
March 6 1991

PS/WP4-0072

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DON MRC MALLAN	CRC Ottawa	613-970-4123 -978-2556	973-9950 Secretary
George Hanover	EIA	202 457 4975	4985

**PHILIPS****Philips Laboratories - Briarcliff**

March 21, 1990

To: Members of ATSC Specialists Group on Interoperability
and Consumer Product Interface - T3/S2

Subject: EIA ATV Multiport Receiver Subcommittee
Phase I Activities Summary Report

Enclosed is the latest version of Phase I Activities Summary Report of the EIA ATV Multiport Receiver Subcommittee, as requested at the last meeting of T3/S2. I hope that you will find the information in the report useful for the April 19 joint meeting both as a progress report and as background for discussing current subjects.

Eugene Lubchenko

Tel: 914 945-6317
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*Hold for the meeting***RECEIVED**

MAR 29 1990

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Electronic Industries Association



EIA ATV MULTIPORT RECEIVER SUBCOMMITTEE

PHASE I ACTIVITIES

-- SUMMARY REPORT --

Co-chairmen:

Joseph Donahue
Senior Vice President
Technology and Business Dev.
Thomson Consumer Electronics

Arpad Toth
Chief Scientist
ATV Technology Planning
Philips Laboratories

February 1990

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. INTRODUCTION
2. ATV SYSTEM ARCHITECTURE
3. ATV MULTIPORT RECEIVING SYSTEM ARCHITECTURE
4. HIERARCHICAL ATV MULTIPORT RECEIVER INTERFACES
5. DIGITAL ATV RECEIVING SYSTEM EVOLUTION
6. OBJECTIVES AND PROPOSED MILESTONES FOR THE NEXT STUDY PHASE

ACKNOWLEDGEMENT

EXECUTIVE SUMMARY

The need for multi-media interoperability between NTSC and new Advanced Television (ATV) signals in the home was recognized as a key need by the EIA Advanced Television Committee. An EIA ATV Multiport Receiver Subcommittee was formed to address the interoperability issue through the use of receiver multiports. The subcommittee's charter is to define the external receiver interfaces required to economically and functionally interface with the respective NTSC and ATV services of the future.

Phase I activities of the subcommittee have been completed. The committee first prepared a "generic" model of a TV receiving system wherein the basic structure of receivers and monitors, and the potential physical interface points were defined.

Using the generic model, the committee has proceeded to structure a hierarchical family of receiver/monitor interfaces which will satisfy a range of modes from the very simplest requirement of a conventional NTSC receiver to NTSC/ATV receivers with baseband inputs involving conditional access and signals of analog or digital format. The receiver manufacturer will determine what level of standardized interfaces to use with each receiver model.

The hierarchical family of ATV multiports will have the following characteristics.

1. Analog Minimum Service NTSC/ATV Receiver/Monitor

- * NTSC/ATV RF input port
- * NTSC/ATV video and audio ports
- * Optional other standard ports

2. Analog Extended Service NTSC/ATV Receiver/Monitor

- * NTSC/ATV RF input port
- * NTSC/ATV video and audio ports
- * Conditional access port
- * Optional other standard ports

3. Digital Extended Service NTSC/ATV Receiver/Monitor

- * NTSC/ATV RF input port (analog)
 - * NTSC/ATV video and audio ports (analog)
 - * Digital ports
 - * Optional other standard ports (analog or digital)
 - * Optional conditional access port
-

This multiport structure will provide receiver manufacturers, television service providers over alternate media, and consumers with standardized interfaces that will economically serve their needs at all desired levels of performance and complexity.

The formulation of the concept of the basic hierarchical family of ATV receiver interfaces completes Phase I of the EIA ATV Multiport Receiver Subcommittee efforts. Phase II will now address the further structuring of the specific interfaces of multiports. While completion of Phase III involving the detailed interface specifications must await the selection and definition of the ATV delivery system standards, standardization organizational activities can proceed in parallel with this work.

All parties are welcome to participate in the ATV Multiport Standards process. Copies of the "Generic Receiver" and Phase I reports can be obtained from the EIA.